

AVIATION

The Oldest American Aeronautical Magazine

OCTOBER 11, 1926

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Navy Vought UO-1's (Whirlwind Engines) of the Scout Cruiser and Battleship Division

VOLUME
XXI

SPECIAL FEATURES

NUMBER
15

A FLYING TOUR OF THE NEAR EAST—LESTER D. GARDNER
EXPERIMENTAL DETERMINATION OF STRENGTH OF METAL WING

GARDNER PUBLISHING CO., Inc.
HIGHLAND, N. Y.

225 FOURTH AVENUE, NEW YORK

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under Act of March 3, 1879.



Boeing Pursuit Ship

SPEED.

Packard-powered Boeing FB 3 sets new world's record of 180.495 miles per hour for standard pursuit ships

TENTH to start in a field of twelve, the

Boeing FB 3 which won the Pursuit Ship Race in the recent National Air Races steadily forged ahead past plane after plane and established a new world's speed record of 180.495 miles per hour for standard pursuit ships.

To win in place would have been a striking achievement in itself, but to win and at the same time to forge ahead in the front ranks of the field, was an unusually spectacular demonstration not only of the speed of the Packard-powered Boeing

plane, but of its ease of handling and maneuvering, and of the skill of its pilot, Lt. C. T. Caddy, U.S.N.

In this race, as in so many previous ones, Packard Aircraft Engines again demonstrated their superiority in speed, in efficiency, and in dependability.

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ASK THE MAN WHO OWNS ONE

OCTOBER 11, 1926

AVIATION

VOL. XXI. NO. 15

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SCINTILLA

AT THE NATIONAL AIR RACES

The Boeing FB-3 piloted by Lt. G. T. Caddy

Won the Free-for-All Pursuit Ship Race

Powered with a PACKARD Engine

equipped with

SCINTILLA

The Wright Apache piloted by Lt. C. C. Champion was powered with a

PRATT and WHITNEY "WASP"

equipped with

American Built

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A PREDICTION REALIZED



The New Curtiss "FALCON"

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FIRST - SECOND - FOURTH - FIFTH - in the Liberty Engine Builders' Race for observation airplanes at the Philadelphia National Air Races.

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AVIATION

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No. 15

The New Air Regulations

THE ANNOUNCEMENT that the Department of Commerce will modify the drastic rules that appeared in its first draft of the regulations on aircraft, operations and pilots and which were published last week in *Airletter* will be welcomed by everyone interested in the progress of American aviation. It is unfortunate that these hastily prepared and wholly unnecessary and restrictive regulations were issued, even for the modification of the people most concerned. The one requirement for the most important step in the control of commercial aviation is to make study and advice from those who are to bear the burden of the new regulations. A point change that was generally shared should be self-immediately. The effect of the new regulations should be too well known to require further official comment. No one that appeared at the congressional hearings on the bill advocated the regulations issued as drafted, and yet, in the first draft, there will be found interpolated, word for word some of the most objectionable details of European regulations.

Parts of the French regulations appear to have been copied without any consideration being given to recent developments. Such a method of preparation is not one that will achieve that end which it was intended to achieve. For several weeks and then a new draft will be made.

Fortunately, the situation of Secretary McComb has been called to these serious and necessary requirements and is known to be entirely willing to have them modified. The hearings on the new rules will continue for several weeks and then a new draft will be made. At that time, everyone interested in the effect of the regulatory rules of the Department of Commerce should give his final opinion of the requirements and the every effort to have them as brief and simple as possible.

The End of a Great Flight

ON THE completion of his third remarkable trip, Alcock, the well-known British long-distance pilot, arrived back in London, from Melbourne, Australia, after a flight of a total distance of approximately 26,000 miles, on the afternoon of Oct. 1. If there are any who have some misapprehensions as to the real value of long distance record breaking flights, they should look to the last achievement of Alcock for some enlightenment. Alcock has not yet got to his spectacular flights on such. Nevertheless, his trips are all spectacular because of the one with which he carries his undertakings to success. His aim has always been to demonstrate to the world at large and to the people of his own country in particular, the possibilities of long distance air navigation here. And he carries out these aims with the certainty of clockwork.

The story of Alcock's London-Melbourne-London flight is a long one, in many ways, and will be read with a complete interest from the entire world community. It will tell more of the progress of the world's aviation than any other story that has been told since the first flight of the Wright brothers. Alcock's flight was not a simple one. He started from London, England, on the morning of Oct. 1, and after a long and arduous journey, he landed in Melbourne on Oct. 11. He was in the air for 33 hours and 30 minutes, and he flew 26,000 miles. He was not alone on the ground; he was accompanied by a pilot, a navigator, and a mechanic. The flight was a great achievement, and it was a great triumph for the world's aviation.

What has been learned from the flight is of great importance. It is a great lesson for the world's aviation, and it is a great lesson for the world's people. It shows that long distance flights are possible, and it shows that long distance flights are necessary. It shows that long distance flights are a great part of the world's aviation, and it shows that long distance flights are a great part of the world's life. It shows that long distance flights are a great part of the world's progress, and it shows that long distance flights are a great part of the world's future.

Alcock has employed the identical airplane on each of his last three great flights, London-Boston and back, London-Tientsin and back, and London-Melbourne and back. The total distance of his last three flights is 26,000 miles. He has flown 26,000 miles in the air, and he has flown 26,000 miles on the ground. He has flown 26,000 miles in the air, and he has flown 26,000 miles on the ground. He has flown 26,000 miles in the air, and he has flown 26,000 miles on the ground.

It is estimated that Alcock has flown approximately 100,000 miles in his extended air journey. He has announced that he would never give up flying, but will take a well earned rest by traveling in the United States. When he arrives in this country he will be welcomed as one of the best known figures in the world of flying. He deserves universal approval for his achievements in fostering the development and extension of air transportation.

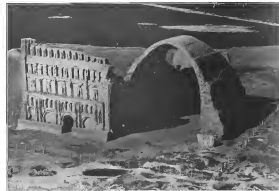
An Air Tour of the Near East

By LESTER D. GARDNER
(FIFTY PART)

TO THE newly arrived air tourist in Baghdad, the number of interesting local sights to be seen and the historical places to be visited will create a bewildering state of mind that only becomes cleared by a visit to the Baghdad in the aviation center of the Middle East, as the part of the country is also called. From here we realize that here have gathered in small towns by the Iraqi Air Force will come dry later passengers to the coast and inland with the pleasure of the Persian Gulf and to the north to Mosul and connect with the air lines that will come down through Turkey from Europe and connect with London, to Paris. For the purpose of this brief sketch, the country between Baghdad and the Turkish frontier will have to be expected as a regularly opened air line, only it is not as yet taken over by a commercial company for the convenience of passengers.

In another article, the history, operations and administration of the Iraqi Air Force will be given the detailed treatment that they should have and some of those who have made aviation history in Iraq introduced to American readers. As this article of aviation is concerned only with the commercial aviation possibilities of the country, the more important and significant military use of aircraft here will have to wait.

If a thin cloud were laid over the map, beyond the Arabian Desert, with one tip at the Persian Gulf where the two great rivers flow from the east, the Baghdad and the Tigris, and the other, and the other is the mountain of Kurdistan, the entire part of the world would be revealed. It will have that the world's historical references we have, of mankind, give us facts that the traveler will wish to know.



The Ark of Chaldeans, before Baghdad on the Tigris. The opening of great hall of Chaldeans was covered with a high arch. This is one of the largest arches ever built. The whole structure is made of brick.

The garden of Eden, Mount Ararat, the sites of Ur, Babylon, Nineveh, not to omit the later Baghdad and Constantinople, all include and those who get to see these historic landmarks of travel will not want to return without visiting some of these remarkable places. But here is where air transport will provide about the only practicable means of viewing these historic spots without great inconvenience and loss of time. This trip to Babylon is no trifling one. By air, it is only a few miles from Baghdad to a very short hour's ride. The fact that the boat is crowded and views seen from the air the view is so much more impressive that there is not the slightest doubt that the air transport that comes this way is the fastest well deserved that a fast service, at least, be available for this side trip. Flying to Babylon is one of the most extraordinary air trips conceivable. After half an hour, the huge mass of the Persian palace at Constantinople is reached. If this great pile were in any suitable part of the world it would have been one of the great wonders, but here, as it is, in a most difficult locality to reach, it has remained available only to the most intrepid travelers.

The Ark of Chaldeans

The huge ark spanned the great hall of Chaldeans who was the most powerful King in the world at his time. After he had ruled Jerusalem, he brought his remains to the Holy Cross here and far long it remained. The entrance to the hall was covered with one of the largest carpets or rugs ever manufactured, it being a hundred feet high. From the way, these ruins look even more impressive than from on the ground.



Left is River Tigris. The ruins of Babylon which have been excavated. The walls of the great wall and a monument. East bank faces the west of the river while the left bank is toward the east.

For from here the traditions of the large city that surrounded the palace can be seen running down to the Tigris.

Babylon—The World's First Great City

Coming from the fertile shores of the Tigris which are lined with their palms, to the Euphrates, only about twenty minutes by car, the name of Babylon comes into view. The fact of the material is almost identical, for all of the old city ruins are now more or less in the half that is regarded as the famous Tower of Babel where the confusion of tongues occurred. The slope of the hill going down to the river was covered with the ruins of many houses in the early morning hours of the Hanging Gardens of Babylon, one of the seven wonders of the ancient world. Flying over the city itself, the temples and streets that have been uncovered in recent years by antiquarians, the outline of the land of Babylon, where Daniel imprisoned the land during the war, as well as the walls that surrounded the capital, can be seen at a single glance. As the city of Babylon at the height of its glory was many miles around, the only general idea of the immense area that it covered can be formed from an aerial view. In another hour, the traveler is back in Baghdad, having in a short run hours seen what it would have taken days to cover by ordinary means of transportation, and at the same time saw some of the grandeur of the historic ruins that could be viewed in any other way.

Modern Baghdad

The city of Baghdad is comparatively modern, when compared with Babylon and Nineveh whose history runs back to over 4000 years. It has been developed in so many years that the old streets of Babylon or Nineveh are no more but lie to the north of the present Baghdad. The mosques,

temples, houses, streets and houses all have several centuries but the river shore with its old boats is the most attractive for the moment.

To the north of Baghdad, where one is flying, the first place to be seen is the city of Mosul, with its famous mosque which has been one of the most picturesque scenes in the world. They are situated with houses built and may be seen far across the river. As these aerial photos may not be taken by aerial cameras, the only way to get any adequate impression of them is from the air. Here again it is to be seen the great advantage of this mode of travel. A few miles to the north, another and even more ancient city comes into view, it is Sinjar, where a Mohammedan prophet disappointed from being a king and who it is believed by the faithful, who has founded a sect, some back out of the world to reveal the world. Over the spot, a beautiful shrine has been built and here two domes, one of gold and one of blue rise out of the desert plain. The city is surrounded by a wall and has the appearance from the distance of one of the Mohammedan styled cities of medieval times.

The Holy City of Samarra

Samarra, was the capital of the Caliphs, after Baghdad became too metropolitan for them. The ruins of the old city may be seen for miles. It was over twenty miles long and the city of New York could be placed inside its boundaries. The streets may still be traced and from the air it looks like a very modern city, the name of an ancient city.

Following the Tigris, a series of walled cities may be traced, the most noteworthy of which are Anasir the capital of the Assassins, and Nimrud, the home of the earliest and

On the valley of the River Jordan it runs to the north and the entire length of the Dead Sea to the south. While lying at first on an thousand feet, the precipitation of the lower general section may be observed. The Jordan has crossed the wild and desolate valley that it flows through before it reaches that where it discharges into the Dead Sea at 1300 feet.

Experimental Determination of Strength of Metal Wing

Wind Tunnel and Static Tests on Wing of Edo Metal Flying Boat.

By ALEXANDER KLEMIN

David Graduate School of Aeronautics, New York University

PRESSURE DISTRIBUTION tests in the wind tunnel and static strength tests have recently been conducted at the David Graduate School of Aeronautics of New York University for the wing used in the new Edo aircraft Corp. flying boat, now in process of construction at College Point, L. I., N. Y., to the design of B. V. Kervin-Krasinsky, the chief engineer of this company.

The design of the wing panel provides a most interesting illustration of what efficient design can achieve in ascribing the strength of a wing along its span to its planform aerodynamic characteristics, and at the same time so as to provide span depth corresponding to the loads imposed at different points of the wing span. The structural design of the wing also provides a novel and ingenious attack on the problem of diminishing bending effects as a consequence without resorting to multiple spar construction.

Providing complete description of the structure, which no doubt will follow the flight tests, on profile of its static characteristics will verify both the aerodynamic and structural aspects involved.

Brief Description of Plane

The boat is a monoplane, the wing being in line with the upper part of the hull and supported by a V strut on either side. The wing is hinged at its point of attachment to the hull. Accommodation is provided for pilot and three passengers, and the engine is a 13 hp. Anzani. The following are the general characteristics of the airplane.

Span	45 ft. 6 in.
Length	24 ft. 0 in.
Wing area	1,100 sq. ft.
Wing loading	12.5 lb. per sq. ft.
Wing chord	6 ft. 0 in.
Wing thickness	10 in.
Wing weight	13,750 lb.
Wing strength	175 lb. per sq. ft.

Aerodynamic Form of Wing

The general character of the wing, for which the *Aero-engine* No. 3-A was used as the base section, is shown in Fig. 3. The wing has a high upper and lower camber at the root, with comparatively little over depth. From the root outward, the upper camber increases slightly and the lower camber

diminishes until there is a pronounced Phillips entry and spar depth is increased. Therefore, the upper camber diminishes and the wing passes into a thin double-cambered section at the wing tip.



Front view of the Edo flying boat giving a very good idea of the shape line of the machine. A close inspection of the photograph will reveal the changing depth of the wing across the span.

The model used for the wind tunnel tests was a semi-span, scaled 25 in. long, with a chord of 6 ft. That the span with a projecting flat end was used, so that the largest possible model could be inserted in the tunnel. Ten capillary tubes, taken at 1/32 in. intervals, were let into the wing, and from small holes in these tubes the pressures on the upper and lower surfaces of the wing model were measured. The holes in each tube on each surface gave a total of 200 holes at which observations were made. The pressures were measured with the Koffert type gauge in the difference between the pressure of the wing and a side plate in the tunnel.

The model was tested at angles of attack of 10 deg., 5 deg. and 13 deg. deg. referred to the chord line. These settings were taken in correspondence to diving, high speed, and low speed conditions, respectively and tests were made at air speeds of 40 mph.

From the results, lines of equal pressure at the three conditions of test were obtained, diagrams of which are shown in Figs. 2, 3, and 4.



Fig. 1.

Also from the curves along the chord the coefficient of pressure normal to the wing was obtained. The average values of this normal pressure were as follows:

Chordline	R_p	Pressure
Up. surf.	3.600	35 lb. per sq. ft.
W. surf.	2.110	—15 lb. per sq. ft.
Chordline	mean	—15 lb. per sq. ft.

The wing meets the view requirements of the design admirably. At the root there is high camber, but comparatively little spar depth, which is as it should be, since the bending moments are zero at the hinge. Where both the maximum

bending stresses and the direct compression of the left hinge occur, the wing has its maximum spar depth. Toward the tip where the stresses are low, the spar depth reaches approximately a constant value.

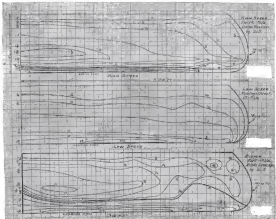
But it is, perhaps, more noticeable that by shifting the two generally accepted theory that the lift of a wing element depends not on the thickness but on the camber of the airfoil line, the designer has combined with unified structural characteristics, a pressure distribution along the span which is highly desirable aerodynamically.

Elliptical Loading Aimed At

By the now well-known theory of induced drag the elliptical, it is advantageous to have an elliptical pressure distribution along the span of the wing. The induced drag due to the tip vortex is thereby reduced to a minimum for a given value of the lift coefficient. Reducing the induced drag is particularly important at high lift coefficient corresponding to climb, when the induced drag becomes the preponderating part of the total resistance of the wing.

This elliptical lift distribution is advantageous has been demonstrated not only theoretically, but also in the wind tunnel (see *Experiments des Aerodynamischen Versuchsanstalt* in Göttingen, Vol. 1, Part IV—3).

In the Göttinger experiments it was sought to obtain an elliptical lift distribution by progressive decrease in the angle of incidence or washout toward the tip. In the lift wing, applied lift distribution has been obtained at both high incidence and low incidence without change in the angle of incidence.



Figs. 2, 3, and 4. Lines of equal pressure across the span.



The Edo flying boat (Edwards, 15 hp.)

8 was obtained from the equation:
 $8 = \frac{1}{2} \pi (R \sin \theta - D \sin \phi) / (R \sin \theta + D \sin \phi)$
 with R/D taken as the 1/10 of the Aeromarine No. 3-A, where R/D equals the R/D of the Ede wing, the Aeromarine No. 3-A being the basis of design for the Ede wing.

The distribution of loads along the chord was arranged for high and low speeds, corresponding to typical aerodynamic pressure curves obtained from the wind tunnel tests. In the low incidence condition, since an updraft would be applied during static tests, the loads were applied only in the rear of the point where the sum of the upward and downward air pressures was equal to zero. The character of loading along the span was likewise in agreement with the pressure distribution curves.

The wing was set up in the inverted position, at an angle of incidence as calculated by the above formula, and with a negative dihedral of nine degrees to take care of the deflection. The large portion of the wing and the points of attachment of the bracing struts were sketched and attached in the middle of the laboratory as a means of obtaining exact structural conditions. Joints were placed under the points of the wing, these joints being at junctions of the compression or tension tubes with the spars. Since the test point was not secured, this member struts were pinned across the ribs to support the large air forces used in tests.

Low Incidence Test

The first load applied was of three factors. There was average loading in the ribs aft of the rear spar. The load was increased in line and a half factor, with increased deflection in the ribs at the trailing edge. One rib of about two feet from the root of the wing broke at the rear auxiliary spar, at its upper spar struts, and the others in that region were dangerously broken after they were attached to the rear auxiliary spar.

The load was increased, and the ribs at the compression tubes were reinforced with two light strips of wood, 1 in. by 3/16 in., from lower rear spar to upper rear auxiliary spar, secured with glue and nails.

The load was further increased in ten and a half factors. The trailing edge supported the load for about one and a half minutes. Then the reinforcements began to loosen, and im-

ports were placed underneath the trailing edge to reduce the load of excessive bending in the rib tail plate. However, when the joints were lowered, these supports proved to be too high, so that the trailing edge gradually loaded as them. This set up extra stresses in the ribs, breaking one of the rear spar, and as soon as one broke, all of the rest immediately broke, breaking off the entire trailing edge aft of the rear spar. This probably would have happened even if the trailing edge had not loaded on the supports, inasmuch as the glued supports were giving way. With the reinforcements attached in a proper manner, the ribs can stand more than the 100 lb. factor. That this is the case was shown by a control rib test conducted on the rib loading surface of the United Graduate School, which stood up to a factor of 18 at the low incidence condition.

As seen from the difference diagram for the low incidence condition in Fig. 3, the difference in the deflections of the front and rear spars is not large, considering the concentrated character of the loading on the rear spar.

Before the test could be further tested, for the low speed condition, boards were placed directly across the spars, in order that the proper chord distribution might be obtained in loading. This was satisfactory, since the maximum rib stress, none in the low incidence condition, where so much of the load is aft of the rear spar.

High Incidence Test

For the high incidence condition, loads corresponding to 4 1/2, 6 1/2 and 10 factors were applied.

At nine loads, after three and a half minutes, a very slight loading was noticed at the bolt in a bearing plate at the strut attachment in the forward spar, but this was not of a serious nature.

At ten loads, soon after the joints began to be lowered, a noise was heard at the strut at the point of attachment to the ribs. The wing gave considerably, and settled on the ribs. Upon examining a direction in the left rib, it was the center of the bolt hole and another through the outer shell of the rib, along the bolt hole. These breaks were in the rib's web of the ribs, no failures being found made on the main spar plate, which was designed to take most of the load. This construction is shown in Fig. 5.

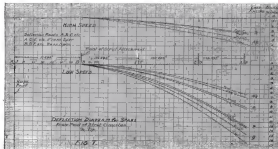


Fig. 7 Wing Deflection Diagram

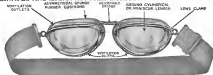
Meyrowitz Luxor Goggles are worn by America's best known pilots



"Coney" Jones at the finish of the Free-for-all race at the National Air Races, Sept. 4th, 1935, which he won with his Curtiss "Griddle" flying at an average speed of 136.11 miles an hour.

around a 12-mile course 5 laps, a total of 60 miles. "Coney" Jones is one of the best known aviators in the United States—a typical American commercial pilot. He wears the

NUMBER 6 U. S. AIR SERVICE MODEL ORIGINATED AND MANUFACTURED EXCLUSIVELY BY E. B. MEYROWITZ



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With ground polished and cyphered lens white lenses	(Elastic Band)
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With ground polished and cyphered lens white and opaque (green) lenses	With good quality lined rubber or opaque (green) lenses
With ground polished and cyphered lens white and opaque (green) lenses	With good quality white lenses
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With ground polished and cyphered lens white and opaque (green) lenses	With good quality white lenses
With ground polished and cyphered lens white and opaque (green) lenses	With good quality lined rubber or opaque (green) lenses



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$$W = (L \cos \phi - D \sin \phi) / \delta$$

where

$$L = W (W_0 - W) - W_0$$

δ being load factor

W_0 , gross weight of plane

W , weight of wing panel

ϕ , angle of attack

δ , angle of inclination of wing to horizontal during stall

test

Upon further examination, it was found that the front strut terminal at the spar had completely failed. It is hard to say whether this at the other end failed first, but it is quite logical that the left compression strut broke first, since at the spar connection had gone first, the load would have been released by the wing settling on the jacks to some extent. This failure was complete, extending through both mild and mild steel.

Upon still further examination, a looking in the upper angles of the forward strut, Fig. 5, at the fourth strut bar from the left was noticed. It then became clear that one of the strut connections at the spar, where the compression loads in the spar are highest, it might really be considered as a direct compression failure of the spar. Inasmuch as the failure was where the compression loads were relatively low, it is safe to say that the failure was caused by the sudden jolt the spar experienced when it landed on the jacks after the test had failed.

Recording of Deflections

Deflections were recorded after the loads 6 and 8 failed were removed. These deflections lay on a straight line for all points at which readings were taken, so it was safe to assume that there was no permanent set in the spar structure, the deflection being undoubtedly due to elastic yielding in the spring holding the panel in position.

In Fig. 7, deflections are plotted as calculated or measured from a line passing through the beam pin and the strut connection. All considerations of the effect of the self weight is thus eliminated. It is really the deflections referred to this line that are of interest in the consideration of secondary

stress in the spar. It is worthy of note that the deflections for front and rear spar are almost identical in value, which is a clear indication of the basic bending properties of the wing.

General Conclusions

With the single reinforcement in the portion of the rib behind the rear spar, the strength of the wing should record by actual factors the 60% load factor for the low resistance condition stipulated by the designer.

The load factor of ten is more than ample for a machine of this type, as shown by the high resistance condition results. Particularly in view of the fact that the load factor was based on the gross weight of the plane with considerable overhead, the structural properties of the wing may be considered as entirely satisfactory.

The design of the wing is particularly interesting from the point of view of elimination of wing deflection between front and rear spar, and hence the elimination of twisting or torsion in the wing. It is also a matter of consideration that such a result has been achieved without the use of multiple spars by the extensive employment of torsion tubes.

Ryans on Colorado Airways Route

The Colorado Airways, Inc., of Denver, Colo., operators of Continental Air Mail Route No. 12, have recently received the first of six new Ryan monoplanes ordered, to be used in their mail, express and passenger service. A good example of the efficiency of this plane for such work was demonstrated when it was tested from the Ryan factory at San Diego, Calif., to Denver, Colorado, via the Los Angeles-Salt Lake route in a total of 11 hr. flying time. This performance is remarkable when it is considered that this particular plane is only powered with the 250 Hispano-Suiza engine. With this new equipment to service the same schedule a more early start, in fact when the prevailing strong winds are encountered. The Mono Sales Co., of Denver, have taken the Ryan agency in Colorado, and already have arranged to deliver two additional planes to private operators this month.



Continental & Deflection

The designer conceived for the United Air Ministry by A. F. Fair the well-known aircraft manufacturer, for experimental purposes. The design has been successfully developed and the various models constructed. When certain tests have been successfully carried out, it is proposed to build a big machine to carry passengers and driven by two Hispano-Suiza engines totaling 500 hp.

The Mono Sales Co.

DENVER, COLORADO

Announce

The selection of RYAN M-1 monoplanes standard equipment by C. A. M. No. 12,

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Encouragement of Civil Aeronautics

The Department of Commerce Has Big Program for Fostering Civil Aviation

SINCE THE signing of the Air Commerce Act of 1926 by President Coolidge on May 20, there has been much speculation as to what would be the outcome, direct or indirect, of this legislative measure. Much discussion has taken place on the current interpretation of the numerous provisions of the Act in which, of course, the questions of regulation have been paramount. There is no doubt that even the Department of Commerce itself has been constantly pre-occupied over some of the details of this new activity with which it has been endowed. The problem of encouraging civil aeronautics is not an easy one but Secretary Haverly's department has been working on its new field of industrial promotion work steadily since the civil aeronautics bill was passed by Congress.

Under the guidance of Assistant Secretary MacCracken, the Aeronautics Branch, Department of Commerce, has just issued a statement setting forth clearly and in detail the activities proposed under the new act and the actual work which these activities will be carried on the immediate future. It must be recalled, of course, that while the Department of Commerce has been created with the power to promote and encourage, regulate and coordinate commercial aeronautics, as far only the totally inadequate sum of \$20,000 has been set aside by Congress for this gigantic purpose. It will, therefore, be responsible for the Commerce Department to do more than the wealth of the nation at any time or under whatever its emergency and foster commercial aviation throughout the country.

Wide Field of Activity

Briefly, it is asserted that the Department of Commerce will encourage the establishment of airports, airports and other aeronautics facilities, study the possibilities of the development of air commerce, industry and trade, establish and maintain civil airways, operate and maintain between airports, landing fields, highways and other aerial routes, and radio direction finding facilities, check services and publish air maps; recommend to the Secretary of Agriculture necessary aeronautical service; collect and disseminate information relative to air commerce and the state of the art, submit and transfer funds to other executive departments agencies to research and development of air navigation facilities; recommend, record and publish issues of accidents, collisions with foreign governments civil air administration.

To enforce, the Department of Commerce will take over the services and air navigation facilities now under jurisdiction of the Postmaster General, (such airports and terminals, which may be transferred to the jurisdiction of the municipalities concerned).

Investigating Accidents

One of the most interesting items contained in the report of activities of the Department of Commerce is that the numerous the investigation and publication of causes of accidents. While it is true that the widespread publication of lengthy accounts of airplane accidents is a very obvious form of sensational publicity, there is little doubt that a great deal of good could be done by a careful investigation, by an impartial body, into the cause of certain accidents in civil flying and the publication, to the commercial community only, of the results of such investigations with recommendations for avoiding such accidents in the future. If the board of a certain airport or municipal use contribute a hazard to airplanes taking off and landing on that field, then it is to the good of aviation to have the fact pointed out definitely, so that other fields may be made similarly, if it is a result of an accident, it is very definitely shown that a certain person or factor of an airplane is liable to failure, then this can be shown definitely by investigation, the same factoring of the machine will be only less serious to be able

to measure that the matter has been looked into and the necessary changes in design made. It must be remembered, at least, that the question of a design being seriously and well never arise since an airplane of such design would not be flying in serious commerce in view of the aeronautical requirements. It should be recalled that the act provides for scientific and foreign commerce only and, presumably, therefore, accidents in private aircraft, which, some laws and all too, will be due to stress in painting, will not be regulated by the Department of Commerce.

The various activities, among the regulatory powers reserved to the Department of Commerce is:

Registration of aircraft records, making of such cards for recordkeeping; examining and setting of the standards, pilot, machine or number of such cards; making of the regulations of registered aircraft and the person in charge of inspection, control or repair thereof; examination and taking of air navigation facilities available for the use of registered aircraft or in their vicinity for such use; maintaining air traffic rules.

Other Government Departments

In the matter of supervision of other Government departments, it is now well known that the Weather Bureau of the Department of Agriculture is planning to furnish weather reports, forecasts and other material to airports and, via, radio facilities are available, to aircraft direct. The Secretary of the Treasury will designate ports of entry for foreign aircraft or American aircraft operating foreign services and arrange for customs inspection, etc.

At this time, it will be interesting to set down definitely for reference purposes, the present commercial aviation system as operated in the United States as a modern from which civil aviation is to grow under the encouragement of the Department of Commerce. In the first place, the Trans-Continental air mail route operated by the Post Office Department between New York and San Francisco made its first connection there that it serves 2000 miles. The night service between New York and Chicago is also well known. This route is 779 miles long. There are between other routes in active operation by private enterprise under contract with the Post Office Department. Two more services are expected to be in operation in the near future and still others are projected for such countries. There is also the Alaskan route operated in Waco only and one or two privately operated routes set, as yet, carrying mail. The following is a summary of these air services:

- 1 Boston-New York, 110 miles, Donald Air Transport.
- 2 Chicago-St. Louis, 100 miles, National Airways Corp.
- 3 Chicago-Detroit, 100 miles, National Airways Corp.
- 4 St. Louis-Chicago, 100 miles, National Airways Corp.
- 5 St. Louis-Chicago, 100 miles, National Airways Corp.
- 6 St. Louis-Chicago, 100 miles, National Airways Corp.
- 7 St. Louis-Chicago, 100 miles, National Airways Corp.
- 8 St. Louis-Chicago, 100 miles, National Airways Corp.
- 9 St. Louis-Chicago, 100 miles, National Airways Corp.
- 10 St. Louis-Chicago, 100 miles, National Airways Corp.
- 11 St. Louis-Chicago, 100 miles, National Airways Corp.
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- 16 St. Louis-Chicago, 100 miles, National Airways Corp.
- 17 St. Louis-Chicago, 100 miles, National Airways Corp.
- 18 St. Louis-Chicago, 100 miles, National Airways Corp.
- 19 St. Louis-Chicago, 100 miles, National Airways Corp.
- 20 St. Louis-Chicago, 100 miles, National Airways Corp.

Passengers Also Carried

The majority of these services carry mail only. However, the Western Air Express, the Philadelphia Rapid Transit, the Florida Airways, the Mount Air Services, and the Northwest Airways, carry passengers. With a view to decreasing the immediate costs for expansion of these air services, the De-

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partment of Commerce is conducting a survey of air transportation with particular reference to the existing commercial service. At present, these contract and scheduled services are operated on daylight hours with the exception of certain routes of the Pacific Air Transport route which has been opened up for the past few months. The increased use of the airplane demands that there be carried out over these and other routes by night as well as by day and it is the purpose of the Department of Commerce to furnish to air traffic these aids which will result in the greatest degree of efficiency.

To Light Airways First

The Department of Commerce looks upon the lighting of the airways in the most urgent of the aids to be provided for the management of commercial flying. The development of a system of weather report communication between, at first, these stations at which airplanes regularly alight, is considered of prime importance, with the provision of radio beacons and radio markers and, finally, the maintenance of radio communication with airplanes in flight, providing weather information and other data.

It is planned to install as soon as possible, aerial light-houses with revolving beacons along all the airways and, where the terrain is particularly mountainous or rough, "beacons" will be placed between beacons at every five miles. For the remainder year 1936 it is proposed to build approximately 1,500 miles of the 7,638 miles of navigated airways, it being totally impossible for the Department of Commerce, on the small amount of money now available, to provide lighting facilities on all of the airways or to furnish radio or any other navigational aid.

The lighting program provides installation of 24 air-terminating searchlights at intervals of 30 miles along designated only of existing routes on which the present schedule demands flying in the dark of early morning and evening. The only exception to this 16 mile program will be the route of coast routes and intermediate airports. The first light will be placed at 30 miles from the terminal and the second light at 45 miles, thereafter, at 15 mile intervals. In the next 16 miles of each of these 30 mile intervals, there will be placed four gas lanterns. This installation near the terminal will offer an opportunity for comparison in various weather. Another consideration which supports the reduction of the number of electric lights, is the fact that the illumination of a city or village at a considerable distance. At the intermediate airport places, the standard lights are being placed at 30 mile intervals, stopping the airport field.

Routes to be Lighted

The 1,500 miles of lighting to be provided this year is divided over seven of the air route routes as follows:

	Feet	Lighting	Hours
1. New York-Boston	170	100	100
2. New York-Chicago	270	120	120
3. Boston-Chicago	100	100	100
4. New York-City New York	100	100	100
5. Chicago-St. Louis	100	100	100
6. Chicago-San Francisco	100	100	100
7. Chicago-Puerto Rico	100	100	100
	1,500	1,200	1,200

At intervals of approximately 30 miles, lighted intermediate aids are being located. These are issued from three sources and only such aids will be given, because as well as previously located intermediate aids. The construction of each field will be authorized in weather proof 25 with electric beacons connected with local lines or operated by three light towers. The standard beacons will be placed at every 30 mile interval. Every intermediate aid being made to complete this partial lighting of the seven airways already commenced before the dark days of the fall set in. Changes have been made in the 24 air-terminating lights, towers, gas lanterns, wind markers and other equipment. Several pilots have started on completed airways on the seven routes being partially lighted. These survey pilots by the routes, locate the 24 air-terminating lights and the 16 mile intervals between the 24 air-terminating lights.

It is planned to install the intermediate radio beacons on airways

during the next fiscal year. In order that some experience may be obtained in the working of the radio beacons on a commercial agency, a Government radio beacon is being installed at the College Park Field of Washington, D. C. on the route of the proposed New York Airline service are being used by the P. A. C. air service from Philadelphia to Norfolk, Va. It appears to be the plan of the Department of Commerce to use the College Park Field as a sort of full-scale laboratory for the testing out of aids in air navigation, but it is proposed to experiment also on a series of smaller airports to test the radio beacons and other aids.

This is probably a very good plan for there is little doubt that much development work can be done before the season actually is closed out of these "radio" airways. Generally, the radio beacons towers will be located at 30 mile intervals along the airways, at the airports, probably, leading along the airway behind and ahead of a "radio" especially a non-landing series of beacons, headed by the pilot. Off the course in the night, the pilot finds the beacons changed to dash and dot, the letter "N" in Morse, and he knows his plane will be lost again the steady dash. Off the course he knows he has been dot and dash, "A", and he corrects his course accordingly. In between these radio beacons, on the intermediate fields every 30 miles or so, will be little automatic radio "beacons" transmitting signals to tell the pilot where he is along the route.

Weather Service

From many standpoints, the most important "aid" shortly to be provided by the Commerce Department is that which is known as "weather service" though this does not by any means indicate that the Weather Bureau will be in a position to serve any type of weather called for. Under this new "weather service", the Weather Bureau will establish (and has already given a long way towards doing so) 177 new "upper air" stations along the airways. By telephone or teletype, pilots engaged in interstate commerce (and presumably private lines are also included) will be advised of weather conditions in these sections to be flown over and will receive forecasts several hours ahead.

The project and considerably proposed airways and the Trans-Continental Development line are being served this year by a set of 50 Weather Bureau offices, (regular) and 17 Weather Bureau and 1 Signal Corps upper air stations, distributed along the airways now in operation or to be established by the end of the year. In addition, there are many other weather forecast stations operated by both the Signal Corps and the Navy which will cooperate in the airway program.

Where there is no upper air office at an airport, the upper air and flying weather reports will be forwarded by the upper air observer working in conjunction with the local airport and Weather Bureau office, in the adjacent airport wherever it may be required, at least sufficiently prior to the departure of planes. (Example—Kansas City will transmit upper air and flying weather to Wichita or Kansas, as necessary.)

Where there is a regular Weather Bureau office and an upper air office at an airport, the regular Weather Bureau office, in conjunction with the local airport office, will, upon request, forward a report of local flying weather conditions to other adjacent airport, where required, at times sufficiently prior to departure of planes. (Example—Hartford Weather Bureau office will transmit flying weather to Boston or New York Field, as necessary.)

When weather observations are taken at special places, such as intermediate fields where there is neither a Weather Bureau office nor upper air observer, the special observer, who may be the controller, will upon request forward the flying weather report to the adjacent airport, as required at times sufficiently prior to the departure of planes. (Example—Troyes Field will be asked for weather report by Los Angeles.)

It is hoped that eventually it will be possible to institute a grand system of communication between airways along which not only weather reports will be transmitted but also reports of arrivals and departures of airplanes and other

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CONSOLIDATED AIRCRAFT CORPORATION

Buffalo, New York

Cornerstone of Buffalo Airport Laid

By G. Cohen Denton

Although the weather interfered with part of the program, which had been planned for the laying of the cornerstone of Buffalo's new airport, Sept. 25, several hundred spectators viewed the ceremony and witnessed the laying of the stone in a test. The Rt. Rev. William Turner, bishop of Buffalo, opened the ceremony with an invocation and a blessing of the persons of workers. In the temporary absence of Mayor Frank E. Bohn, Mayor John M. Satterfield, a priest, acted as the emcee of the ceremony. The 26th Infantry Band, from Fort Niagara, led the parade of the musical portion of the program. W. Irving Glavin, Special Assistant, Postmaster General in charge of Aviation, delivered a short address.

It is noted that Buffalo should have the airport project, as it has been active in aircraft manufacturing for many years. Thousands of airplanes were built there during the war, and Buffalo is the home of the Curtiss Aeroplane & Motor Co. production plant, the Consolidated Corporation, the G. E. Allen Aircraft Co., the Divers Propeller Co., and the Sheehan Aircraft Co.

During and immediately following the war, Curtis Field, located north of the city, served the purpose of military pilot



Field 1-Engine Tunnel at opening at Buffalo airport

and landing planes, but there developed a steadily increasing demand for more complete flying facilities. The first plan of Buffalo, which by this time was composed largely of former air service plans, began tentative and derived considerable efforts to this location and expanding by the city at a suitable airport site.

In 1922 and 1923 various prospective airport sites were submitted by the Army, the Buffalo Chamber of Commerce and other organizations. One was approved by Mayor George M. Patrick for an air service reserve station and airport. The thought of developing Curtis Field was abandoned as its use was limited and drainage poor. A thorough study was then made of present and future requirements and those submitted to the problem, because of similar developments in other cities. With this information, the Buffalo Chamber of Commerce undertook in 1925 an extensive investigation of suitable airport sites in the vicinity of the city. Three were recommended and one was approved by the City Council. This site, owned by the Buffalo Twp. and Gas Co., consisted of 150 acres. Two and 338 acres of adjoining land were purchased, and two separate lots totaling \$170,000 were made. Additional improvements were made for the improvement of the property, amounting to about \$250,000. The airport is under the Department of Public and Police Buildings and all expenditures and improvements made by the city are under the supervision of the Department. The airport is therefore municipally owned, developed and operated. Heavy space and land for building purposes are to be reserved for air service and aviation projects and concerns and manufacturers. The City Council selected

LAMBERT E. M. MOORE, former air service pilot and manager of Curtis Field, as manager of the airport.

Work was started on the field May 1, 1928 and it has been in constant use ever since. Buffalo Airport is located just east of the city, about two and a half miles from the city line and eight miles from the center of the business district, just east of and behind station, with which it is directly associated by Glavin. It is situated by a recently highway with all main roads leading out of the city. It is bordered on one side by the Lehigh Valley Railroad and the New York Central main line.

The airport is of irregular shape, approximately a mile square. It is, in fact, flat ground, having a gentle slope, which, together with the complete pipe drainage system, which has been installed, ensures adequate drainage. There are two main center runways, one in an east and west direction and the other in a north and south direction, each having 1000x200 ft. These are approximately in the direction of the prevailing winds. Other runways are being constructed and are expected to be completed in the spring of 1937.

Three hangars have been constructed, two of which are 400x100 ft. and the third one 500x200 ft. These are of steel, brick and glass construction, giving the best possible daylight facilities inside. The concrete foundations are a substantial size, extending along the front of each hangar. Completely equipped garage and shop are also finished and the expansion has been installed. A special gasoline supply tank, equipped with fire protection features, is being constructed, it is used for refueling on the field. There are also first aid rooms, and the administration building, which occupies a full acre of the field, is under construction.

Byrd Plane Making Long Tour

The *Geographica* 4-engine plane has flown one of the longest tours ever undertaken by a commercial airplane in this country.

During October the *Polaris* plane, which Comdr. Richard E. Byrd flew to the North Pole from Sparsbergen, will start on a tour which it is expected will cover about 1,000 miles in six weeks. The tour is sponsored by the Department of Commerce and is being undertaken with the aim of acquainting the public with commercial aviation and airport facilities. The plane will be piloted by Floyd Bennett, Comdr. Byrd's pilot on the *Polaris* flight, and by Lieut. Brent Inglish, formerly of the *Northwestern Star*, whose cooperation at Sparsbergen was of great value to Comdr. Byrd.

The *Polaris* assignment is now being regarded at the Polar Aircraft Company's plant at Hudsonburgh, N. Y. The plane is also being dismantled and made comfortable for the journey going. The three *Winged Victory* engines have been recently reconditioned and are considered practically as good as new. Besides the two pilots Thomas Kinkaid, the Wright field mechanic, who had charge of the engine at Sparsbergen, will go along.

The plane started from Washington, D.C., on October 7, and flew to New York, with Assistant Secretary of War, E. Allen Dornier, Assistant Secretary of Navy, Edward Warner and Assistant Secretary of Commerce, Wm. F. Mac Cracker, Jr.

D. B. Colyer, to be New Air Mail Superintendent

Postmaster General Nease has announced the appointment of D. B. Colyer, of Newark, N. J., as assistant superintendent of the National Air Mail Service, to succeed Mr. Oiler. Mr. Colyer is to become traffic manager for the New York City, Chicago.

At the same time the Postmaster General announced the appointment of D. B. Colyer, of Newark, N. J., as assistant superintendent of the National Air Mail Service, to succeed Mr. Oiler. Mr. Colyer is to become traffic manager for the New York City, Chicago.

Motor Test House at Pittsfield Factory

The need for a consistent and accurate test stand for new engines has led to the construction of a complete engine test stand based at the Pittsfield factory of Buick Motors. The main object was to construct a building in which to test the engine while operating under conditions similar to those present in actual service. The stand was designed to permit observations to be made while records taken continuously and automatically. The latter is very important if the records are to be of any value.

While no provision is at present made for recording the horsepower of engine tested, calibrated propellers at those of known characteristics are used. Fuel is measured by a Brown-Boveri flowmeter placed in the delivery pipe, together with the other suitable instruments and controls. Although air-cooled engines will be principally tested, the stand accommodates other types including the Curtiss OX5 and OX6, and provision is made for a water tank over the office. Air-cooled engine testing can be conducted either with the doors wide open and self-induced air stream only, or the air can be supplemented by a very convenient form of water flow system which we believe to be original. This is achieved through a return air tunnel of retractable system outside one wall of the building, connected at each end by leads having a three foot diameter orifice opening. Air from the propellers is then returned to the front of the engine and accelerated on a three foot diameter orifice duct not opposite the engine. By manipulating the doors, this air can be the total air stream or simply a supplemental air stream the engine.

The air flow in the ducts in the tunnel is checked by well fitted internal wooden vanes. The elevating effect is completely isolated from all currents and eddies. Windows are covered by heavy mesh wire, and as the propeller end of the test house are installed three 10 ft. sliding gates, which give

first access to the propeller for wrapping wire starting. The sides of the building are of 1 in. thick concrete, boiler plate 3 ft. wide is fixed in the sides opposite the propeller. The stand rests on a solid concrete block 3 ft. thick and the walls on blocks 2 ft. from the ground. The roof joints support a second steel girder on which rest a traveling chain hoist; the lighter enough four feet over the rear wall to provide convenient landing and unloading of engines.

The new test house is being constructed, was designed by Robert W. A. Brown, engineer for Pittsfield Aviation, Inc.



The Pittsfield Motor Test House. The engine test house and test stand at the Pittsfield factory. The left door is opened to show the engine stand. The floor of tunnel inside is made of, in place for the nature of aluminum in the front of the engine. The tunnel walls are composed steel to provide a large cooling surface for the air stream.

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New Clipped wing Standards with Government overhauled OX5 motor installed	900.00
New Clipped wing Standards with new OX5 motors installed	1200.00
New Clipped wing Standards with 150 H.P. Hino motors installed	1500.00
New Regular size Standard J.I. Airplanes with Government overhauled OX5 motor installed	1600.00
New Regular size Standard J.I. Airplanes with new OX5 motors installed	1900.00
New Regular size Standard J.I. Airplanes with 150 H.P. Hino motors installed	1900.00
Used Standard J.I. Airplanes	\$650.00 to \$750.00
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AN INDEX TO



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PUBLISHER'S NEWS LETTER

There is one phase of air transport that is hardly ever considered or mentioned when the subject is discussed, yet which is one of the most serious obstacles that will have to be overcome before air transportation becomes as popular as transportation when the vital problem of safety is solved. Air sickness is gradually assuming an importance that should be given the closest attention. It prevents them from being as successful means of conducting it. While the same difficulty has always been present in traveling by boat, it has been possible for them who are afflicted in this way to isolate themselves by remaining in their staterooms. An airplane who is greatly inconvenienced by air sickness put it on a boat one is only sick in two dimensions but in a plane the passenger has five to overcome. In fact, at present there is hardly an obstacle that air transport has to overcome that has a more serious aspect than this very acute problem.

The number of persons that are affected by the motion of airplanes is variously estimated to be between five and ten per cent. The reason is that few have to enter in the use of air sickness bags that are carried on all well equipped air liners. The number that are made "uncomfortable" is more difficult to estimate, but it is not too much to say that for every trip of a plane carrying many seats is twenty passengers that someone is affected by the motion of the plane. First, of course, is a direct cause the effect of one person being affected makes it disagreeable for the others. Nostrils can, at a given time, be congested as to the roughness of the air and it is impossible to enjoy an attempt to start out for a flight on what appears to them a perfect day well, then, to find that the air is filled with pockets and gusty wind. On air trips of over two hours, the fatigue of the flight will have to be faced and given the most crucial situation.

The cause for the unfortunate discomforts of air travel have not been clearly determined. To many, air sickness is attributed to the closed cabin and while this undoubtedly has some effect, owing to the lack of ventilation in most cabin planes, it is not the real cause. Vertigo, too, has been blamed for the discomfort that many feel in the air. While this certainly adds greatly to the

underlying cause, it cannot be said to be the fundamental reason. Ventilation is probably the one necessary requirement on an airplane that has been given the least thought by designers. If they provide windows that open, they feel that the passenger can be left to regulate his or her own ventilation. This is, of course, passing the problem to the passenger who may be subject to ill effects of drafts, or may inconvenience the passengers behind, or what is more important may have to make calls to secure the proper amount of fresh air.

Some of the lines provide so-called "sea sickness" remedies or some passengers who have had experience on rough days carry sleeping powder. These remedies, while they are helpful in certain cases do not go to the root of the trouble. To do this, requires that the designer build his cabin with this important disadvantage in mind. A proper ventilating and heating system should be provided on every air transport plane, a feature that is lacking on most of the planes now in use, or, at least, given the most satisfactory treatment. Window ventilation is worse than useless as the air from a window usually blows on the passengers in the rear and affects all those who are seated back of the open window. In summer or at low altitudes on pleasant days the movable windows may provide a pleasant and refreshing breeze, but when the weather is cool or cold, this form of ventilation is not practicable. Comfortable travel is also too often neglected. The designer believes of he gives the passenger a metal bucket instead with a little sympathy that the crew will take his mind off the discomfort. It can be confidently asserted that a comfortable seat is one of the prime requisites of any air transport plane and will have much to do with the state of the passenger's comfort in the air as well as it is related to vertigo. By cooler is meant, not only moderate seat comfort problem, but a place to put the head in case of vibrations or sickness. To see passengers looking straight windows with coats as pillows, is one of the signs that indicate that the builders of the plane did not think about the necessities of air travel from the point of view of the passenger or the requirements of a properly equipped airliner. No air transport company that is looking to the future of its passenger traffic can afford to overlook these two important essentials, comfort and ventilation—L.D.C.

WRIGHT WHIRLWIND ENGINES WON

FIRST—SECOND—THIRD

In the Second Annual Airplane Reliability Tour

August 7th - 21st

Covering 2560 miles over ten States, starting and finishing at Detroit, Mich.

- First** —“Travel Air,” 4-seater, built by Travel Air Mfg. Co., Wichita, Kansas, carrying 600 lbs. contest load, average speed 124.5 m.p.h. Powered with one WRIGHT WHIRLWIND engine.
- Second** —“Airster,” built by Buhl-Verville Aircraft Company, Detroit, Mich., carrying 800 lbs. contest load, average speed 113.5 m.p.h. Powered with one WRIGHT WHIRLWIND engine.
- Third** —“Detroitter” built by Stinson Aircraft Corp., Northville, Mich., carrying 640 lbs. contest load, average speed 106.7 m.p.h. Powered with one WRIGHT WHIRLWIND engine.
- Ryan M-1, built by Ryan Airlines, Inc., San Diego, Calif., carrying 500 lbs. contest load, average speed 111.8 m.p.h. Powered with one WRIGHT WHIRLWIND engine.
- Ford 3-engine Airliner, built by the Airplane Division, Ford Motor Company, Dearborn, Mich. Powered with three WRIGHT WHIRLWIND engines.

National Air Races—Philadelphia, Pa.

September 4th - 11th

WRIGHT WHIRLWIND engines won twelve of the eighteen prizes they contested for.

Air Transport Race—First in Speed and Efficiency, “Wright-Bellanca”, powered with one WRIGHT WHIRLWIND engine, carrying 1607 lbs. contest load, average speed 121.53 m.p.h. Second in Speed and Third in Efficiency, Buhl-Verville “Airster” powered with one WRIGHT WHIRLWIND engine, carrying 1059 lbs. contest load, speed 119.97 m.p.h. Third in Speed, Ford 3-engine Airliner, powered with three WRIGHT WHIRLWIND engines, carrying 2666 lbs. contest load, speed 114.26 m.p.h.

Light Commercial Airplane Race—Trophy won by “Wright-Bellanca”, powered with one WRIGHT WHIRLWIND engine, carrying 1145 lbs. contest load, speed 121.36 m.p.h. Third in Speed and Efficiency, “Travel Air”, powered with one WRIGHT WHIRLWIND engine, carrying 666 lbs. contest load, speed 127.2 m.p.h.

Denver Mile High Air Meet

August 1st - 3rd

First place in Speed Race for over 100 H.P. planes won by Ryan M-1 powered with one WRIGHT WHIRLWIND engine.

First place in 5000 ft. altitude climb for over 100 H.P. planes won by Ryan M-1, powered with one WRIGHT WHIRLWIND engine.

First place—Best General Ship at Meet—won by Ryan M-1, powered with one WRIGHT WHIRLWIND engine.

WRIGHT AERONAUTICAL CORPORATION

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